January 5, 2015

U.S. Fish and Wildlife Service
Attn: Docket No. FWS–R8–ES–2014–0041;
U.S. Fish & Wildlife Headquarters
5275 Leesburg Pike
Falls Church, VA 22041–3803

RE: Peer Review of the Proposed Rule: Threatened Species Status for West Coast Distinct Population Segment of Fisher

Comments: Proposed Rule

1) Small Population Size Stressor – this section omits any discussion of the issue of low genetic diversity in small populations which is an issue that has been well documented in the California fisher populations (Wisely et al. 2004, Knaus et al. 2011, Tucker et al.2012, 2014). This section also lacks a discussion of the long term genetic isolation of the small SSN population (Knaus et al. 2011, Tucker et al. 2012) which can exacerbate issues concerning small populations.

2) DPS configuration – alternative 2: As the SSN population shows some markedly different characteristics from other populations (linear habitat distribution, long term isolation, increased susceptibility to wildfire, etc.. as detailed in the draft Species Report) there is likely potential benefit for this population in designating the SSN as a separate DPS to allow for a specialized management approach for recovery. However, given the severe range reductions from historic conditions in Oregon and Washington I am not sure that this option (Alternative 2) is adequate to address the issue of fisher's status throughout the West Coast, as it would exclude these areas.

Comments: Draft Species Report

1) I found the discussion of the genetic research (Knaus et al. 2011, Tucker et al. 2012) regarding the timing of the gap in the historical range between the NCSO and SSN populations is incomplete and does not fully reflect the findings of these studies. While these studies are mentioned at different points in the text there is no thorough explanation of the evidence leading to the finding of long term isolation in the SSN. There is no discussion that 2 genetic studies using different types of DNA (mtDNA- maternally inherited vs nuclear DNA –bi-parentally inherited) arrived at similar conclusions regarding long term (1000+ years) genetic isolation of the SSN. Generally, I found that this topic received only cursory discussion in this document and needs expanding as the issue of the timing and extent of genetic isolation is an important factor in the evaluation of a DPS.

   A particularly notable absence was any discussion of the findings of Knaus et al. regarding the fixation of the SSN for a single mtDNA haplotype that differs by a large number of mutational steps and their molecular clock estimates for time of isolation. Citations to Knaus et al.2011 need to be added in a number of locations throughout the document (pg 23 – last paragraph, pg 29 last paragraph, pg 146 – first full paragraph, pg – 146 re: genetic diversity).

There is also new information regarding additional unpublished mtDNA analyses. An additional 209 genetic samples were recently analyzed to determine mtDNA haplotypes as described in Knaus et al. (2011). These samples included both historical and contemporary samples from the NCSO and SSN fisher populations. The results found that the mtDNA haplotypes for all these samples are consistent with the Knaus et al. (2011) finding that the southern Sierra Nevada fisher population is fixed for a unique haplotype not found in northwestern California. This analysis shows that the major haplotype distinction reported in Knaus et al. (2011) is consistent even with a much larger sample size and is found in both historical and contemporary fisher samples (K. Pilgrim, USFS, unpublished data; J. Tucker, USFS, personal communication).

2) There is very little mention of the issue of low genetic diversity in the California populations and particularly the SSN. This issue needs to be more thoroughly discussed and there are a number of papers that provide reference for this issue of low genetic diversity in addition to Wisely et al. 2004 (Knaus et al. 2011, Tucker et al. 2012, 2014)

3) I bring to your attention Chapter 4 of Tucker (2013- Dissertation) finding that landscape features that are potential impediments to dispersal have a larger impact on genetic connectivity in females compared to males. Landscape and habitat features important to gene flow for each sex are also detailed in this paper. This research is relevant to the discussion of dispersal (page 12), habitat fragmentation (pages 54-55), and habitat loss attributed to linear features (pg 100). A revised draft of this research is currently submitted and under review to a peer reviewed journal.

4) The use of fisher locations with a reliability rating of 3 -6 is inappropriate (Figures 4, 6, 8, and 9). Per McKelvey et al. (2008) in areas where a species is believed to be absent or extinct only the most reliable records should be used to define a species current or historical range (McKelvey 2008 Figure 2: physical specimen, DNA evidence, or diagnostic evidence such as a photo or track). This exact issue is discussed in the previous section of the species report regarding Figure 7, where only locations of rating 1 and 2 are shown, and yet there is an inexplicable shift to ratings 1-6 in Figure 8 and 1-4 for Figure 9. Based on the arguments in McKelvey et al. (2008) locations with reliability rating 2 (high reliability but no physical evidence) should not be used either. Following evidentiary standards it is not justifiable to include 4 maps with low reliability ratings compared to only 1 map depicting only high reliability records. I think it reasonable to include 1 map showing all records (reliability 1-6) for reference to the reader, but the ratings of each point should be reflected on such a map (different colors or symbols).

   The use of these low reliability records is especially confusing in regards to the gap between the NCSO and SSN as the current maps (Fig 4, 6, 8, and 9) indicate that there have been historical detections (pre-1993) of fisher in the central Sierra, while in fact there are no physical specimens or diagnostic evidence of a fisher detection in the central Sierra north of Yosemite park dating back to museum specimens in the 1880s (see Figure 2, Tucker et al. 2012).

5) Many of the figures or their captions/ legends are unclear as described below:

Figure 6: This map is unclear – it needs a more descriptive caption and a Legend. As it is colored it is difficult to interpret the dots – I interpret them to include both general survey locations (including non-detection survey locations) as well as other reports of fisher locations? If fisher locations are depicted here (unclear) need to clarify which reliability ratings are included.

Figure 7: If both ratings 1 and 2 are included it would be helpful to code the reliability ratings on the map by symbol or color.

Figures 8 and 9: Either remove ratings 3-6 or code by symbol/color.

6) In regards to the Slauson 2009 report detailed on page 27. These estimates for the minimum required effort to achieve a detection probability >0.95 (and therefore conclude fishers are absent) are considerably different from the detection probability estimates reported in Zielinski et al. 2013 which also employ the MacKenzie et al. occupancy modeling methods [Slauson 2009 Figure 6B- detection probability 5 visits = 0.35, Zielinski et al. 2013 5 visits = 0.71]. There needs to be a more thorough discussion of this considering the estimates provided in Slauson et al. 2009 are quite disparate from other estimates of detection probability and the required research effort to accurately detect fisher (Zielinski et al. 2013, Campbell 2004, Zielinski and Mori 2001)

   Campbell, L. 2004. Distribution and Habitat Associations of Mammalian Carnivores in the Central and Southern Sierra Nevada. Ph.D. Dissertation, University of California Davis.

7) Page 27: Paragraph starting "*Because fishers are difficult to detect*…".

   This statement is inaccurate. While it may be difficult to determine fisher occupancy in terms of adequately surveying remote and inaccessible areas, fishers are readily detected using a variety of non-invasive survey methods.

   > Excerpt from Zielinski et al. 2013 "*Fishers are easily detected using noninvasive survey methods (Long et al. 2008), and these methods have been used in standard protocols (Zielinski and Kucera 1995; Zielinski et al. 2005) to generate systematically collected, independently verifiable (McKelvey et al. 2008), and spatially precise detection data*."

   Long RA, MacKay P, Zielinski WJ, Ray JC. 2008. Noninvasive survey methods for carnivores. Washington, D.C.: Island Press.

8) Pg 42 – Top paragraph: "One monitoring program has enabled researchers to measure trends in occupancy within one study area over a period of eight years (Zielinski *et al.* 2013, entire)"
   - Need to clarify that this 'one study area' encompasses the entire SSN population
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9) Pg 43 - Regarding the text" "*Re-creating the sampling scheme of this monitoring program and using the implemented average annual sample size at the Sierra Nevada Carnivore Monitoring Program, Tucker (2013, pp. 80–97) investigated the link between occupancy and abundance, showing that a 43 percent decline in abundance over an 8-*

year period only resulted in a 23 percent decline in occupancy reported. This effort demonstrates the complexities in determining population trend and identifies important cautions in extrapolating the conclusion of no trend in occupancy to a conclusion of no trend in abundance over 8-years of monitoring of the Southern Sierra Nevada Population."

While this statement is accurate I think it is important to acknowledge that these estimates were derived using a spatially explicit simulation approach under specific parameters and an initial population size of N=300. As the relationship between occupancy and abundance varies depending on population density such that for the same simulation using a starting population size of N=150 will result in a slightly greater decline in occupancy.

10) Pg 100. Add to Habitat loss attributed to linear features (highways and other infrastructure) section: A citation and discussion of the observations of genetic population structure in relation to linear features such as the Kings River as detailed in Wisely et al. 2004 and Tucker et al. 2014.

11) Pg 146, top - "*Both the Northern California-Southwestern Oregon and Southern Sierra Nevada populations have small effective population sizes: 129 and 167, respectively (Tucker et al. 2012, p. 7)."*
    - It is important to mention that these effective population size estimates are modes of a distribution of estimated N_e and not point estimates.
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12) Minor correction: Tucker et al. 2013 should be corrected to 2014:

Correct: Tucker, J. M., Schwartz, M. K., Truex, R. L., Wisely, S. M., & Allendorf, F. W. (2014). Sampling affects the detection of genetic subdivision and conservation implications for fisher in the Sierra Nevada. *Conservation Genetics*, *15*, 123-136.

Please contact me if you would like any further clarification of these comments.

Sincerely,

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